

H.A

**Notice of Allowability****Application No.**

10/766,105

**Examiner**

William C. Choi

**Applicant(s)**

SOLLI, DANIEL ROY

**Art Unit**

2873

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11/28/2005.
2. ☒ The allowed claim(s) is/are 5-8, 11 and 15-18.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment                               |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|   | 9. <input type="checkbox"/> Other _____.   |

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All claims pending thus being allowable, prosecution on the merits is closed in this application. A statement of the examiner's reasons for allowance is provided in the paragraphs, which follow below.

### **REASONS FOR ALLOWANCE**

Claims 5-8, 11 and 15-18 are allowed.

The instant application is deemed to be directed to a nonobvious improvement over the invention of Lin et al (US 2001/0012149 A1), as being a representative example in the art to which the instant invention pertains. In particular, said improvement provides a method and apparatus for controlling and/or manipulating the polarization of electromagnetic waves with photonic crystals.

More specifically, independent claim 5 is drawn to an apparatus for controlling the polarization of an incident beam of electromagnetic radiation comprising photonic crystal means that produces a polarization-dependent band structure by interference between Bragg reflections as claimed, specifically wherein a portion of said beam is exponentially attenuated by said photonic crystal means and is reflected so that said apparatus functions as a reflection waveplate (Claim 5, lines 9-11).

Similarly, independent claim 6 is drawn to an apparatus for controlling the polarization of an incident beam of electromagnetic radiation comprising photonic crystal means that produces a polarization-dependent band structure by interference between Bragg reflections as claimed, specifically wherein said photonic crystal means

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reflects a first polarization component and transmits a second polarization component, thereby functioning as a polarizer (Claim 6, lines 10-12).

Independent claim 8 is drawn to an apparatus for maximizing conversion efficiency in nonlinear optical mixing processes comprising birefringent photonic crystal means composed of material with optical nonlinearity for achieving phase matching as claimed, specifically wherein said photonic crystal means is adapted to reduce the wavevector mismatch  $\Delta k$  between incoming and output beams to zero using said photonic crystal birefringence (Claim 8, lines 6-8).

Finally, independent claim 15 is drawn to an optical apparatus for creating a delay line arising from a transfer of energy between two different polarizations of electromagnetic waves as claimed, specifically wherein either a delayed or advanced transmitted electromagnetic waveform or wavepacket results by adjusting either the relative angular orientations of said birefringent crystal means, polarizer means and/or incident EM wave polarization (Claim 15, lines 8-10).

The prior art taken either singly or in combination fails to anticipate or fairly suggest the limitations of applicant's independent claims, in such a manner that a rejection under 35 U.S.C. 102 or 103 would be proper. The claimed invention is therefore considered to be in condition for allowance as being novel and nonobvious over prior art.

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### OTHER REMARKS/INFORMATION

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C. Choi whose telephone number is (571) 272-2324. The examiner can normally be reached on Monday-Friday from about 9:00 am to 6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on (571) 272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*W.C.*

William Choi  
Patent Examiner  
Art Unit 2873  
February 1, 2006

  
Hung Yuan Deng  
Primary Examiner